

Abstract

A system and method for performing sputter etching includes an ion source that generates an ion current that is directed at a substrate and an electron source that generates an electron current directed at the substrate. Biasing circuitry biases the substrate with an a-symmetric bi-polar DC voltage pulse signal. The biasing circuitry is formed from a positive voltage source with respect to ground, a negative voltage source with respect to ground and a high frequency switch. At least one current sensor, coupled to the biasing circuitry, monitors a positive current and a negative current from the substrate during one or more cycles of the a-symmetric bi-polar DC voltage pulse signal. A control system, coupled to the at least one current sensor, varies the ion current independently from the electron current. The ion and electron sources create a continuous plasma that is proximate the substrate and the biasing circuitry causes the substrate to alternatively attract ions and electrons from the plasma. The ions attracted from the plasma sputter etch the substrate. The electrons attracted from the plasma neutralize accumulated charge on the substrate.